

# Overview of EPA Biofuel Activity

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# Overall structure

## OTAQ activities

- Focus on implementation of RFS2
- Review of candidate pathways, guidance documents, assessing volumetric requirements

## ORD activities

- Focus on R&D to inform options that lead to a sustainable biofuels industry



# OTAQ - Recent and Ongoing Activities

## Review of candidate pathways:

- 38 pathways currently under review ("pending", next slide): Need to determine lifecycle GHG emissions for each pathway  
<http://www.epa.gov/otaq/fuels/renewablefuels/compliancehelp/rfs2-lca-pathways.htm>
- Notice of Data Availability (NODA) for palm oil (Jan 2012) and grain sorghum (July 2012).  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f11046.pdf>  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f12029.pdf>
- Supplementary determination on grain sorghum (Sept 2012).  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f12078.pdf>
- Other fuel pathway rules pending.

## Setting Volume Standards:

- 2013 Biomass-Based Diesel Volume Final Rulemaking (Sept 2012).  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f12059.pdf>
- Notice of Proposed Rulemaking (NPR) for 2013 volumetric requirements.  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f13007.pdf>

## Guidance:

- NPR for voluntary Quality Assurance Program for establishing Renewable Identification Numbers for the RFS program (January 2013).  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f13005.pdf>
- Proposed modification to RFS to broaden the definition of heating oil that qualifies as renewable (Oct 2012).  
<http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f12061.pdf>

# Pathways currently under review



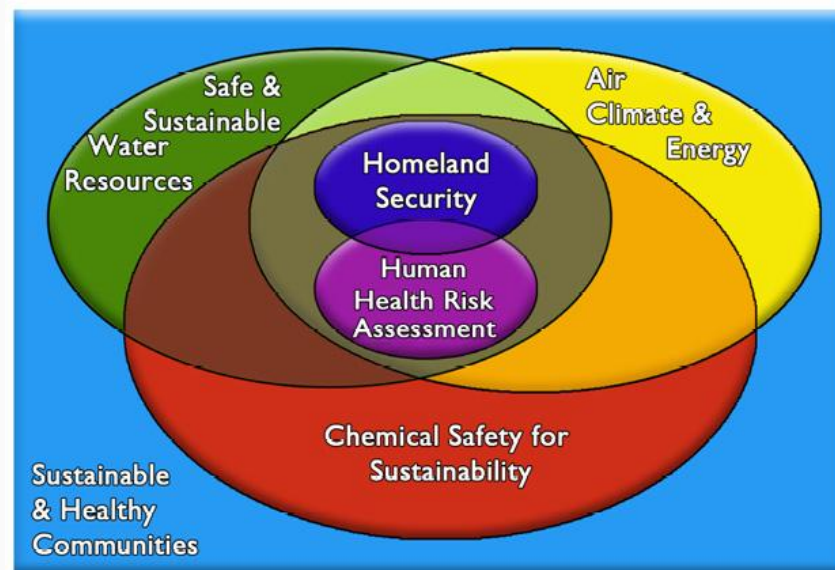
#	Company	Fuel	Feedstock	Process
1	11 Good Energy, Inc.	New (G2 Diesel)	Soy bean oil, Oil from annual cover crops, Algal oil,	Esterification
2	Absolute Energy, LLC	Ethanol	Biogenic waste oils, fats, greases, and Canola oil	New (proprietary)
3	Arvens Technology, Inc.	Biodiesel	Corn	Transesterification
4	BP Biofuels North America, LLC	Cellulosic biofuel	New (pennycress)	Any
5		Cellulosic biofuel	New (energy cane)	Any
6	Chemtex Group	Cellulosic biofuel	New (napiergrass)	Any
7	Conestoga Energy Partners, LLC, and Bonanza Bioenergy, LLC*	Ethanol	New (arundo donax)	Any
8	Dakota Spirit AgEnergy, LLC	Ethanol	New (grain sorghum)	New (proprietary)
9	Diamond Green Diesel, LLC	Ethanol	Corn	New (proprietary)
10	DriveGreen, LLC	New (renewable naphtha)	Biogenic waste oils, fats, greases	Hydrotreating
11	EdeniQ, Inc.	New (renewable electricity)	Landfill biogas	New (proprietary)
12	E Energy Adams, LLC	Ethanol	Corn kernel fiber	Any
13	Element Markets, LLC	Ethanol	Corn	New (proprietary)
14	Emerald Biofuels LLC, Global Clean Energy Holdings, and UOP LLC	CNG	Biogas from anaerobic digesters	Any
15	Emerald Biofuels LLC and Global Clean Energy Holdings	Renewable diesel, jet fuel, and naphtha	New (Jatropha)	Hydrotreating
16	Gevo	Biodiesel		Transesterification
17	Golden Renewable Energy, LLC	Isobutanol	Corn	New (proprietary)
18		Renewable diesel	New (municipal sewage sludge),	New (proprietary)
19	Green Vision Group		Biogenic waste oils, fats, greases	
20	Growing Power Hairy Hill**	Ethanol	New (energy beets)	Fermentation
21	ICM	Ethanol	New (wheat starch)	New (proprietary)
22	Iogen	Ethanol	Corn	New (proprietary)
23	Kior, Inc.	Ethanol	New (grain sorghum)	New (proprietary)
24	Montana Advanced Biofuels, LLC	New (renewable gasoline blendstock)	Cellulosic biomass	New (proprietary)
25	National Cottonseed Products Association	Ethanol	New (barley, wheat starch residue)	Fermentation
26	National Sorghum Producers	Biodiesel, renewable diesel	New (cottonseed oil)	Transesterification
27	New Generation Biofuels Holdings Inc.	Ethanol	New (biomass sorghum)	Any
28		Renewable diesel, heating oil	Biogenic waste oils, fats, greases	New (proprietary)
29	Osage Bio Energy, LLC	Renewable diesel, heating oil	Biogenic waste oils, fats, greases	New (proprietary)
30	Permeate Refining, LLC	Ethanol	New (barley)	Fermentation
31	POP Diesel, Inc.	Ethanol	Non-cellulosic separated food waste	Any
32	Rothsay Biodiesel	New (un-transesterified plant oil)	New (jatropha oil)	New (proprietary)
33	Solazyme	New (biodiesel)	Biogenic waste oils, fats, greases	Transesterification
34	Sundrop Fuels, Inc.	Biodiesel, renewable diesel, jet fuel		Transesterification
35	Terrabon, Inc.	Biodiesel, renewable diesel, jet fuel	Carbohydrate, Algae	Hydrotreating
36	WM GTL, Inc.	New (renewable gasoline)	Cellulosic biomass	New (proprietary)
37	Unspecified	New (renewable gasoline)	Cellulosic biomass	New (proprietary)
38	Unspecified	Cellulosic Diesel	New (landfill biogas)	Any
	Unspecified	Biodiesel	Oil Palm	Transesterification
	Unspecified	Renewable diesel, jet fuel, naphtha	Oil Palm	Hydrotreating



# ORD – Overall Research Landscape

ORD structure: Six overlapping research programs.

- ACE (~16 projects related to BRDB)
  - Sustainable Energy Evaluation 1 (SEE-1, Lead - Rebecca Dodder, NRMRL): Primarily focuses on the broader energy landscape, including socioeconomics, LCA development, and other factors.  
*5 projects*
  - Sustainable Energy Evaluation 2 (SEE-2, Lead – Mark Higuchi, NHEERL): Primarily focuses on bioenergy (fuels, heat, and power)  
*11 projects*
- SHC (~4 projects)
  - Tools and approaches for utilizing waste (biological and non) for energy and other uses (SHC 3.2.2)
  - Former “Future Midwestern Landscapes” project (within reactive nitrogen management cluster, SHC 3.3.1)
  - Report on the Environment (SHC 3.4.1)
  - National Atlas of Sustainability (SHC 1.2.3)
- Others: SSWR and Nitrogen Cross-cut



<http://www.epa.gov/research/docs/strap-overview2012.pdf>



# ACE Task Highlights

- **ACE 027** – Extensions of modeling tools (MARKAL) for analyzing near to long-range scenarios of the development and scaling up of biomass-based fuels, heat and electric power, in order to identify the potential impacts on criteria air emissions, system-wide GHG emissions, as well as water consumption. (SEE-2)
- **ACE 079** - Develop methods for assessing the ecological impacts of the cultivation phase of the algal biofuels lifecycle. (SEE-2)
- **ACE 086** – Examine the potential environmental and health impacts on air emissions and other environmental media as a result of the deployment of a large number of widespread, small-scale biomass pyrolysis units. (SEE-2)
- **ACE 153** – Life cycle assessment of energy systems, with an initial emphasis on dry grind ethanol from corn and multiple environmental impacts on air, water, and human health. (SEE-1)
- **ACE 198** - Quantifying the benefits and impacts of biomass-based transportation fuels across the emissions, air quality, exposure and health effects paradigm. (SEE-2)
- **ACE 225** – Applying and integrating sustainability metrics for transportation energy systems incorporating ecological footprint (EF), emergy (EM), energy return on investment (EROI), and green net value added (GNVA) to provide a more comprehensive estimate of sustainability. (SEE-2)



# SHC and SSWR highlights

- **SHC 3.2.2.1** – Examine the potential for reuse of Municipal Solid Waste streams for bioenergy, focusing on the three dimensions of sustainability, human health, environment, and economics.
- **SHC 3.3.1.7** - Effects of land use change associated with biofuel production scenarios on water quality and aquatic ecosystems for the 12-state Midwestern region (former “Future Midwestern Landscapes” project)
- **SSWR 2.1.A** - address the sustainability of water resources impacted by agriculture, by providing information and tools on performance of BMPs, at watershed scales, under current conditions and future conditions of climate and land use change.



Thanks and questions